

Application of Information and Communication Technology for Preventive of Communicable Disease by Public Health Workers in States of Northern Nigeria.

By

CHAFA, Mark Vershima (M.Sc.) & GBAJE, Ezra Shiloba (PhD)

Abstract

The study was undertaken to investigate the Application of Information and Communication Technology in communicable disease prevention by public health workers in northern state of Nigeria. Four research questions were raised for the study and a case approach was adopted for the study. Purposive sampling technique was used to select three respondents. The respondents were heads of information and communication units of the public health department of Benue, Gombe and Kaduna state ministries of health. Interview was used as instrument for data collection. The data was analyzed using content analysis and coding. The finding revealed that radio, internet, television and mobile phones were used in communicable disease prevention by public health workers. The study also revealed that Surveillance, education and awareness, mobilization, outbreak alert and appointment reminders were the activities public health workers use ICT facilities for in communicable disease prevention. On usefulness of ICT facilities in communicable disease prevention, the study revealed that ICT targets wide audience saves time address the shortage of staff and eliminate the problems of geographical location. Factors that affect the use of ICTs for communicable disease prevention such as power failure, network problem, failure of equipment, maintenance of ICT facilities and manpower shortage were revealed. The study concluded that ICT facilities were used in communicable disease prevention despite the challenges discovered. In view of this, a number of recommendations were made including addressing the problems of power supply, designing or activating existing websites and proper maintenance of ICT facilities anytime they are used to ensure they are functioning and serving.

Key words: Information and Communication Technology, communicable Disease, Public Health Workers

Introduction

Development in Information and Communication Technologies (ICTs) during the last quarter of the 20th century has heralded an information age in which economic and social activity has been widened, deepened and transformed (Idowu,

2003). The more optimistic projections suggest that a more computerized and networked world would not only ensure a more widespread and rapid growth of employment, productivity and output but would also improve access to facilities that

enhance the quality of life. The expectations that ICTs generate for health improvement stems from three sources; their role as an instrument for continuing education and lifelong learning that will enable doctors to be informed about and trained in the use of advances in knowledge, their use as a delivery mechanism to poor and remote locations of wide variety of services varying from improved public health education to emergency advice, including advice on dealing with and mitigating the consequences of natural disasters and their potential use as a mechanism to increase the transparency and efficiency of governance which would, in turn, improve the available and delivery of publicly provided health services (Curioso and Kurth. (2007).

In public health, an important area of applications of ICT relates to the use of these technologies to widen access to health education and awareness, targeting the poor and the economically vulnerable groups within the society. These efforts can impact on health education, knowledge sharing, health monitoring, statistics gathering and analysis, the delivery of care, and in meeting internationally agreed upon health targets with respect to a number of diseases especially communicable diseases that

continue to pose substantial challenges to public health (UNDP, 2003). Communicable diseases prevention is the cornerstone of public health. According to Breslow (2012), the prevention of communicable diseases is all actions that helps in averting and restricting the occurrence of diseases and halting their progression from their early unrecognized stages to more severe ones respectively. The need for prevention and early intervention is highlighted by the fact that communicable diseases are often a recurring issue in many countries (Samuel, 2008). The likelihood of communicable diseases leading to death and disabilities underlines the importance of its prevention.

Problem Statement

Public health workers are people who are trained and employed in a variety of settings including government, federal, state, local public health and human service agencies. Their function is to monitor and diagnose the health concerns of entire communities and promote healthy practices and behaviours to ensure that the people stay healthy. In a country where there are no preventive measures for diseases such as HIV/AIDS, cholera, tuberculosis, polio etc., such diseases are likely to spread at an

unprecedented rate and may result to death and disabilities (Salem, 2010).

Readily available tools that affect the activities of public health workers is always critical and over the years, the advent of ICTs have contributed immensely to the prevention of communicable disease. The United Nations, in a report, corroborated the fact that ICTs have the capacities of contributing to public health education and awareness, enlightenment, health monitoring, health statistics and achieving the millennium developmental goals(UNDP, 2003). This encompasses the full range of ICTs including global telecommunication infrastructure, cross-border transfer of data, Internet, radio, satellite networks, television and wireless phone. It is therefore essential for public health professionals to use ICTs in communicable disease and also remain relevant in their profession.

However, despite the potentials of ICTs in preventing communicable disease in the study, the big question posed by several scholars(including Walsham 2001; Simba 2004; Bilas& Frank 2010; Mwalimu 2012; and Afolayan 2013) is: are public health workers really harnessing the potentials of ICT facilities in communicable disease

prevention in northern states of Nigeria where such diseases are said to be more prevalent? This is a question the researcher seeks to answer by asking the following research question.

Research Questions

1. What ICT facilities are used in communicable diseases prevention by public health workers in northern states of Nigeria?
2. What specific activities do public health workers in northern states of Nigeria undertake with ICT facilities in communicable disease prevention?

Literature Review

Quite a number of studies have evaluated the use of ICT in communicable disease prevention by public health workers in the developing and developed countries. Some studies that have considered the application of ICT's in communicable disease prevention by public health workers are:

(Idowu et al 2009; Adeyemi&Ayegboyin, 2004; Olatokun&Adeboyejo, (2011) Conford& Bastin, (2008) among others. Specifically, Olatokun&Adeboyejo, (2011) identified ICT indicators such as mobile phones, personal computers, Internet

facilities in Nigerian hospitals. On his own part, Adeyemi (2004), in a survey involving four general hospitals, 10 primary health-care centers, and six private hospitals in Nigeria reported that none of the staff had e-mail access or a Web site and only very few of the workers used computers. On the contrary, Olatokun & Adeboyejo (2009) reported a 100% Internet usage by the public health workers at the University College Hospital (UCH) Ibadan.

A study conducted by Mweeta (2014) on the impact of mass media intervention in Tuberculosis awareness in Zambia revealed that public health workers have shifted from using print media such as newspapers, magazines signposts, bill boards and fliers to using ICTs for disseminating the disease information to those who have the disease and also to those who are at risk of being infected with the diseases. It is worthy of note here that the ICTs used by public health workers today is not limited to the newer technologies like internet and computers but include the same older technologies. Over the last forty five years, Radio and Television stations have been widely utilized by public health sectors and the ministries of health to transmit or broadcast public health programmes to large

audience especially the hard to reach audiences.

According to Muslim (2011), Public health workers are using ICT facilities to disseminate information relevant to the prevention of diseases. *One precondition for halting the spread of communicable diseases in any given society or community is for people to understand how these diseases are transmitted and how they can be prevented.* Sumei (2012) in a study revealed that *Print media sometimes prove to be effective, though in some cases they may be expensive. In such cases, targeted campaigns through local radio and television stations, text messages emails and websites could be an alternative. For example, mobile phones provide a high penetration level and an additional level of privacy not offered by other mass media. In some developing countries like Africa, governments, federal states and local public health and human services agencies, community-based and non-profit organizations are sending text messages to inform, educate and empower the public.*

E-health projects had been successfully implemented in countries like Indonesia, Philippines and Thailand. In Indonesia, an integrated web based GIS was

designed to monitor and detect outbreak of dengue fever amongst children. Similarly, in the Philippines, a Community Health Information system was designed to disseminate health information to the community and public at large. It is worthy to note that these individual projects were implemented in phases and improved on overtime. In Thailand, a low cost hospital information system was designed for rural hospitals to perform certain functions such as work flow management, patient appointment, billing and patient registration. In order to curtail cost, free open source software applications (FOSS) were utilized in a networked environment linking fifty (50) rural hospitals to facilitate knowledge sharing (UNDP, 2007). Similarly, in Uganda the effective use of ICT had prevented avoidable maternal death. In Bangladesh and India the global satellite technology combated the outbreak of epidemics and ensured the effective prevention and treatment through adequate online health information. Mobile Communications based healthcare (mHealth) has already been deployed for remote data collection, remote monitoring, and improved living standards of patients. Mounting interests and growing body of evidence demonstrate the potential of mobile communications to radically

improve public healthcare in the most remote and resource-poor environments of the world. The impact of mobile communications based healthcare (mHealth) is likely to be more far reaching than other developments, which create an urgent need to review the way this ubiquitous healthcare is meeting the needs and promising the change in global health care initiatives. According to Stockdale (2008) Health means using mobile communication devices such as personal digital assistants (PDAs) and mobile phones for health services and information. In broad, it is defined as the use of portable devices with the capability to create, store, retrieve, and transmit data in real time between end users for the purpose of improving patient safety and quality of care. Michaels (2009) extended this definition by focusing on any wireless technologies (e.g. Bluetooth, GSM, GPRS/3G, wiFi, WiMAX) to transmit various health related data contents and services through mobile devices such as mobile phones, smart phones, PDAs, laptops and Tablet PCs. However, this definition has targeted only health workers as the sole users of mobile health services, but there are many Health services which are being used by both patients and health workers, such as, mobile telemedicine services.

Internet-based approaches such as websites and portals have already created a medium in which a greater number of health care organization or authorities can upload and share relevant information and also impact consumers through their engagements with accessible health related information and entities. There are web sites which have been designed mainly for providing information and basic knowledge about health issues. They include **WebMD**, an American corporation which provides health information services. WebMD is primarily known for its public websites regarding health and healthcare including a symptom checklist, pharmacy information, drug information etc. WebMD has an estimated 80 million monthly visitors. WebMD is the leading source of trustworthy and timely health and medical news and information providing credible health (Fox, 2013). Other health websites that perform similar functions include NIH (national institute of health), yahoo health, Mayo Clinic, medicine net, drug.com, mercola.com, Medscape, RXlist, MNT (medical news today etc.) All these website are active and are involved in making disease prevention and health promotion information available.

Methodology

The research used qualitative methodology to gather data necessary to answer the proposed research questions. The case study research method, which allows the researchers explore in depth the application of Information and Communication Technologies in communicable diseases prevention in the target population was adopted. The population of this study was made up of all the nineteen northern states of Nigeria. The target populations used for this study were public health staff of the ministries of health in northern states of Nigeria. A purposive sampling technique was used by the researcher to select the samples. According to Oliver (2013), the main goal of using purposive sampling technique is to focus on particular characteristics of a population that are of interest which will best answer the set research questions.

Interview was adopted to gather data so as to answer the research questions posed in this study. The interview involved the researcher personally interviewing the Heads of Information and Communication Unit(ICU) who were purposively sampled, on a structured set of questions that have been prepared before the interview. This enabled the researcher to explain or elaborate on any

question that was not well understood by the respondents. Before the personal visit to each of the site selected for this study, a letter of introduction was collected from the Department, Introducing the researcher as a master degree candidate conducting research on the topic of the research. The researcher sought for interview appointments with the Heads of these units and succeeded in conducting the interview in ten days using the interview schedule and content analysis and coding were used for analyzing the data.

Discussion

The analysis of data is a narrative analysis of the themes that emerged from the three interviews that lasted for approximately 60 minutes each. This analysis is a presentation with regard to application of ICT facilities in communicable disease prevention by public health workers in states of Northern Nigeria.

ICT Used In Communicable Diseases Prevention by Public Health Workers

Responses received from the interviews revealed that, the three respondents used Radio as tools for communicable disease prevention. Comments such as “radio broadcasting stations, radio is important in fighting communicable diseases, “we cannot fight communicable diseases effectively if we don’t use radio” was heard

during the interview. This finding is in line with the findings of Ochs (2008) and Olatokun and Adeboyejo (2011) who conducted a study on ICT utilization in communicable disease prevention using interview. The result of the study indicated a high utilization of radio in disease prevention by the public health workers. In the interview, the three respondents indicated the utilization of internet in communicable disease prevention. For example, responses which highly indicated that internet was used by the respondents in communicable disease prevention include; “.... *No public health worker in this 21st century who knows what he or she is doing will ignore internet in the fight against communicable disease therefore, we cannot ignore the internet when it comes to communicable disease prevention*”....., “*we use the internet in our activities...*”. This finding agrees with that of Olatokun (2013) who, in his study revealed that the internet is used in almost every activity in the field of public health. The three participants revealed in the interview that they used television in communicable disease prevention. A respondent said “...*television helps us a great deal, that is the more reason why we will continue to incorporate it into our*

activities..." Another respondent mentioned that *most of the activities we do in public health are activities that centered on education, awareness, enlightenment and sensitization. That is why we make use of television to facilitate those activities..."* When you talk about ICT used in communicable disease prevention, you must mention television..." one participant who gave a brief answer to the question he was asked said "...Ah, television must be included among the ICTs we use..." These findings are consistent with the findings of Hall (2007); Richter and Richter (2001) and Smith (2004) who, in a study on ICT utilization discovered that television is used extensively by public health workers in disease endemic regions of West Africa. The three heads of information and communication units who were involved in the interview stated that they used mobile phones in communicable disease prevention. Very brief responses were given by the respondents. For example, one interviewee responded briefly saying "...yes, we use mobile phones very well in disease prevention...." Another interviewee also responded briefly by saying that "you know we must use mobile phones..." Responding to the question also, a respondent said "...you need no one to

tell you that we use mobile phones in this department..." He actually responded that way because some of the staff in the unit were using mobile phones for their public health activities in my presence during the interview. These findings are consistent with the views of Hall (2011 and Richter (2012) who reported that Mobile phones are the most popular and the fastest spreading technologies used in communicable disease prevention by the global public health community.

Activities Public Health Workers Undertake With ICT Facilities in Communicable Disease Prevention

In the interview conducted, the three participants displayed the use of ICT facilities in the surveillance of diseases. One respondent said: "...surveillance is the first measure taking in communicable disease prevention and in this unit, we make use of the mobile phones and the internet for that activity..." Another says that "one important thing we use these technologies for is surveillance and with the emergence of mobile phones and internet, we carry out the surveillance of communicable diseases faster." One respondent who elaborated more on the question posted unto him said "technology has come to stay; Many of the

activities we perform in this unit most especially surveillance have been made much easier for us.....” This finding is supported in studies by Allen and Munaf (2013) who confirm that ICT facilities are today becoming relevant in the field of public health especially in the surveillance of communicable diseases.

When the participants were responding to the questions posed by the researcher, comments such as *“ICT is wonderful in education and awareness creation, we introduced ICTs in this unit to facilitate activities like public education and awareness, if we don’t use ICT in education and awareness creation then we have not done anything”* were heard. One respondent says *“we use television, mobile phones and radio in the education and awareness of the public because it is central in our job.* The same person added that *the internet facility is making the education and awareness of the masses very much easier for us today”*. Another interviewee said that *“when we want to educate the masses and create awareness easily and faster, we employ the use of radio, television and mobile phones to establish that”*. From this comment made by this respondent, it can be seen that internet was not mentioned and when the researchers

asked why they do not use the internet to create awareness, he said *“we use internet in this unit to facilitate some of our activities but we don’t have an active website to post vital information to create awareness on issues like this.* One person said that *“the education and awareness of the masses is of great importance to us that is why we make use of all the available ICT facilities such as our webpage, radio, mobile phones to enhance our activity.* This finding agrees with the findings of Phillips (2013) who revealed that the essence of introducing information and communication technologies (ICTs) in the field of public health is to make sure that the masses are aware and well educated on public health matters.

The three participants interviewed said they mobilize people and the community for one public health purpose or the other with the use of ICT. One respondent said; *“..... and when you want to talk about what we use ICTs for this unit, mobilization is included”*. He added that *“television, mobile phones and radio and our ministry websites have become so useful in this area”*. The researchers sought to find out what exactly people are mobilized for. The responses were for public health

purposes such as vaccination, immunization and seminars. An interviewee said that *“we use television mobile phones and radio to mobilize people for immunization and vaccination exercise”*. Another respondent gave similar response to the one above saying that *“we actually mobilize people for one thing or the other”*. He even gave an example by saying that *“it was through community mobilization that we were able to overcome many public health challenges in this state”*. He continued by saying that *“our method and pattern of mobilization has changed because we employ communication tools most especially the radio, television, mobile phones and our websites”*. This finding is in line with that of Oliver (2010), Ephraims (2010) and Ejiga (2012) who stated that ICTs such as radio, mobile phones, television and internet have found a place in public health institutions and are used widely in disease endemic regions to mobilize communities for public health emergencies.

A respondent said that *“it is our responsibility to alert the public on potential or possible outbreaks of communicable diseases and in doing this, we use basically mobile phones text messages and our website page”*. This finding is in line with

Nahum (2013) who revealed that text messages and web pages are the major channels used to keep the masses posted and ready for any outbreak. Another said *“when a disease outbreak is reported to us, we immediately inform out network service providers whom we collaborate with, to send SMS alerts to mobile phone subscribers*. He continued by saying that *“although, we have internet facility in our unit, we cannot use the internet to do that because our website is not active.”* One respondent confirmed that *“.....since we discovered the effectiveness of SMS and our websites pages, we have been using them to alert the public.”* This finding coincide with the findings of Mofe, (2010), Dekin (2012), Mallah (2013) and Sanaer (2013) who, all said that mobile phones and internet are used in outbreak alert and notification of infectious diseases in the developing countries.

The three participants spoke about appointment reminders as one activity that utilizes ICTs. One participant says that Patients' forgetfulness is one of the main reasons for missed appointments, and *“reminders using mobile phones and emails help alleviate this problem”*. The other respondent says *“yes we have appointment*

schedules and most of them tends to forget. In order for them not to forget, we collect their contact and send them text messages through their phones or emails” One interviewee who made mention of reminder as one crucial activity they do said *“the mode of communicating reminders for appointment to patients are calls on mobile phones, short message services (SMS) and email.”* This finding coincides with the findings of Lacazette (2011) and organ (2012) who found out that public health workers, in order to solve the problem of missed appointment, call on mobile phones, short messages services and emails are used as important, inexpensive delivery medium for reminders for healthcare appointments. The implication of this finding is that the public healths have come of age, i.e. they have perceived the usefulness of these ICT facilities in the activities they perform in communicable disease. Secondly, the application of these facilities in their activities will make the prevention of communicable diseases much easier than it used to be.

Conclusion

Arising from the findings of the study, it could be concluded that public health workers in northern states of Nigeria apply

Information and Communication Technology in communicable disease prevention. This therefore means that the public health workers are aware of the usefulness and contributions of ICT facilities in activities such as surveillance of diseases, public health education and awareness, mobilization for public health emergencies, outbreak alert and notification as well as in appointment reminders. From all indications, the use of these ICT facilities by public health workers will lead to great improvement in the prevention of deadly communicable diseases such as cholera, cerebrospinal; meningitis measles, tuberculosis that have ravaged many states of northern Nigeria.

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